

**Campbell Essential Biology, 5e (Simon/Yeh)**  
**Chapter 1 Introduction: Biology Today**

Multiple-Choice Questions

- 1) In what way(s) is the science of biology influencing and changing our culture?  
A) by helping us understand the relevance of evolution to human health  
B) by revealing how mutations in genes can lead to disease  
C) by providing new tools for forensic investigations  
D) all of the above

Answer: D

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

- 2) What is biology?  
A) the scientific study of life  
B) the scientific study of the environment  
C) the scientific study of DNA  
D) the scientific study of ecosystems

Answer: A

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

- 3) Which of the following is *not* a property of life?  
A) Populations of organisms rarely change over time.  
B) Living things exhibit complex but ordered organization.  
C) Organisms take in energy and use it to perform all of life's activities.  
D) Organisms reproduce their own kind.

Answer: A

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

- 4) What are the two main processes that ecosystems depend upon?  
A) speciation and evolution  
B) nutrient recycling and energy flow  
C) decomposition and nutrient recycling  
D) sunlight and photosynthesis

Answer: B

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

- 5) Which of the following is not recycled but is lost from ecosystems?  
A) nitrogen  
B) energy  
C) magnesium  
D) carbon

Answer: B

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

6) Which of the following is a producer?

- A) oak tree
- B) earthworm
- C) sun
- D) cat

Answer: A

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

7) Humans are \_\_\_\_\_.

- A) producers
- B) producers and consumers
- C) consumers
- D) producers and decomposers

Answer: C

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

8) Which of the following structures can perform all the activities required for life?

- A) DNA molecules
- B) cells
- C) organelles
- D) nuclei

Answer: B

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

9) Relative to prokaryotic cells, eukaryotic cells are usually \_\_\_\_\_.

- A) larger and more complex
- B) smaller and simpler
- C) larger and equally complex
- D) smaller and more complex

Answer: A

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

10) Humans are composed of \_\_\_\_\_ cells.

- A) bacterial
- B) eukaryotic
- C) plant
- D) prokaryotic

Answer: B

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

11) What name is given to the functional compartments of a cell?

- A) genomes
- B) nuclei
- C) genes
- D) organelles

Answer: D

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

12) The DNA of a eukaryotic cell is found within the \_\_\_\_\_.

- A) archaea
- B) nucleus
- C) prokaryotic cell
- D) insulin

Answer: B

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

13) What are eukaryotic genes composed of?

- A) RNA
- B) organelles
- C) RNA and DNA
- D) DNA

Answer: D

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

14) What is a gene?

- A) a type of eukaryotic cell
- B) an organelle that houses DNA
- C) a type of prokaryotic cell
- D) a unit of inheritance

Answer: D

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

15) The human genome consists of about \_\_\_\_\_ chemical letters.

- A) 300,000
- B) 1 million
- C) 3 billion
- D) 300 billion

Answer: C

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

16) More than half of all known species are \_\_\_\_\_.

- A) plants
- B) insects
- C) bacteria
- D) vertebrates

Answer: B

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

17) Taxonomy is the \_\_\_\_\_.

- A) study of cells
- B) naming and classifying of species
- C) study of organisms and their interaction with the environment
- D) study of genes

Answer: B

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

18) How does taxonomy assist biologists?

- A) by providing easily remembered scientific names for organisms
- B) by categorizing diverse items into smaller and smaller numbers of groups
- C) by reducing life to its smallest common denominator, the cell
- D) all of the above

Answer: B

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

19) Which domain(s) consist(s) of prokaryotic cells?

- A) Bacteria only
- B) Eukarya only
- C) Archaea and Eukarya
- D) Bacteria and Archaea

Answer: D

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

20) Which kingdom of Eukarya consists primarily of unicellular organisms?

- A) Plantae
- B) Bacteria
- C) Fungi
- D) Protista

Answer: D

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

21) A newly discovered multicellular organism obtains food by digesting dead organisms. Such an organism is most likely a member of the kingdom \_\_\_\_\_.

- A) Plantae
- B) Fungi
- C) Protista
- D) Animalia

Answer: B

Topic: 1.1 The Scope of Life

Skill: Application/Analysis

22) Members of the kingdom Plantae differ from members of the other kingdoms of Eukarya in that most members of the kingdom Plantae \_\_\_\_\_.

- A) are decomposers
- B) are unicellular
- C) are consumers
- D) produce their own food

Answer: D

Topic: 1.1 The Scope of Life

Skill: Knowledge/Comprehension

23) The branch of biology that explains both the diversity and the unity of life is \_\_\_\_\_.

- A) evolution
- B) microbiology
- C) taxonomy
- D) genetics

Answer: A

Topic: 1.2 Evolution: Biology's Unifying Theme

Skill: Application/Analysis

24) Which of these is most closely associated with Darwin?

- A) energy flow
- B) ecosystem structure
- C) the three domains of life
- D) natural selection

Answer: D

Topic: 1.2 Evolution: Biology's Unifying Theme

Skill: Knowledge/Comprehension

25) Which of these is required for natural selection to occur?

- A) inheritance
- B) unequal reproductive success
- C) individual variation
- D) all of the above

Answer: D

Topic: 1.2 Evolution: Biology's Unifying Theme

Skill: Knowledge/Comprehension

- 26) Unequal reproductive success \_\_\_\_\_.
- A) can lead to a population being less well adapted to its environment
  - B) increases variation
  - C) does not affect the frequency of expression of traits in succeeding generations of a population
  - D) can lead to natural selection

Answer: D

Topic: 1.2 Evolution: Biology's Unifying Theme

Skill: Knowledge/Comprehension

- 27) What does adaptation mean in a biological context?
- A) the way an individual's body adjusts to its environment
  - B) the accumulation of favorable variations in a population over time
  - C) the ability of organisms to alter their appearance under changing environmental conditions
  - D) all of the above

Answer: B

Topic: 1.2 Evolution: Biology's Unifying Theme

Skill: Knowledge/Comprehension

- 28) What accounts for the different breeds of domesticated dogs?
- A) overproduction
  - B) natural selection
  - C) competition
  - D) artificial selection

Answer: D

Topic: 1.2 Evolution: Biology's Unifying Theme

Skill: Knowledge/Comprehension

- 29) Over a span of two decades, scientists measured changes in the beak size of a population of Galápagos ground finches. This \_\_\_\_\_.
- A) provided evidence of natural selection in action
  - B) is an example of artificial selection
  - C) is an example of overproduction
  - D) led Darwin to his theory of evolution through natural selection

Answer: A

Topic: 1.2 Evolution: Biology's Unifying Theme

Skill: Knowledge/Comprehension

- 30) Science is \_\_\_\_\_.
- A) the inquiry-based effort to describe and explain nature
  - B) the search for truth
  - C) an organized set of principles for how to ethically and morally behave
  - D) all of the above

Answer: A

Topic: 1.3 The Process of Science

Skill: Knowledge/Comprehension

31) What is the difference between discovery science and hypothesis-driven science?

- A) Discovery science "discovers" new knowledge, whereas hypothesis-driven science does not.
- B) Discovery science is based on deductive reasoning, whereas hypothesis-driven science is based on inductive reasoning.
- C) Discovery science is mostly about describing nature, whereas hypothesis-driven science tries to explain nature.
- D) Discovery science involves predictions about outcomes, whereas hypothesis-driven science involves tentative answers to specific questions.

Answer: C

Topic: 1.3 The Process of Science

Skill: Knowledge/Comprehension

32) Which of these statements is correct?

- A) Scientific ideas are subjected to repeated testing.
- B) Science can be used to prove or disprove the idea that deities or spirits cause earthquakes and other natural disasters.
- C) Science does not require observations that other people can confirm.
- D) Only discovery science can lead to important conclusions about nature.

Answer: A

Topic: 1.3 The Process of Science

Skill: Knowledge/Comprehension

33) Discovery science is primarily based on \_\_\_\_\_.

- A) hypothesis testing
- B) deduction
- C) experimentation
- D) observation

Answer: D

Topic: 1.3 The Process of Science

Skill: Knowledge/Comprehension

34) Which of these would be a valid hypothesis?

- A) Human history is determined by a series of supernatural events.
- B) Humans should help in the conservation of other animal species.
- C) Humans are controlled by forces beyond our understanding.
- D) Humans and bacteria share a common genetic code.

Answer: D

Topic: 1.3 The Process of Science

Skill: Knowledge/Comprehension

35) A hypothesis is a(n) \_\_\_\_\_.

- A) tentative answer to a question
- B) guess
- C) observation
- D) theory

Answer: A

Topic: 1.3 The Process of Science

Skill: Knowledge/Comprehension

36) You try to start your car, but it does not start. Which of these is a hypothesis?

- A) My car's battery is dead.
- B) If I recharge the battery, then my car will start.
- C) My car is too old to function properly.
- D) What is wrong with my car?

Answer: A

Topic: 1.3 The Process of Science

Skill: Application/Analysis

37) You try to start your car, but it does not start. Which of these is a prediction?

- A) My car's battery is dead.
- B) If I recharge the battery, then my car will start.
- C) My car is too old to function properly.
- D) What is wrong with my car?

Answer: B

Topic: 1.3 The Process of Science

Skill: Application/Analysis

38) Which of the following are the proper components of the scientific method?

- A) experiment, conclusion, application
- B) question, observation, experiment, analysis, prediction
- C) observation, question, hypothesis, prediction, experiment, results, conclusion
- D) observation, question, opinion, conclusion, hypothesis

Answer: C

Topic: 1.3 The Process of Science

Skill: Knowledge/Comprehension

39) In a scientific experiment, the control group \_\_\_\_\_.

- A) serves as a basis of comparison with the experimental group
- B) is subjected to the factor whose effect is being tested
- C) allows for the simultaneous testing of multiple variables
- D) is required for the validity of discovery science

Answer: A

Topic: 1.3 The Process of Science

Skill: Knowledge/Comprehension

40) How do hypotheses differ from theories?

- A) Theories are more comprehensive than hypotheses.
- B) Theories must be testable; hypotheses do not need to be testable.
- C) Hypotheses are educated guesses, and theories are tentative explanations.
- D) Hypotheses are derived from experimentation, whereas theories are derived from observation.

Answer: A

Topic: 1.3 The Process of Science

Skill: Knowledge/Comprehension

41) Antibiotic resistance evolves in bacteria because \_\_\_\_\_.

- A) the presence of antibiotics favors bacteria that already have genes for resistance
- B) farmers do not use enough antibiotics in animal feed
- C) the antibiotics create resistance genes in bacteria
- D) none of the above

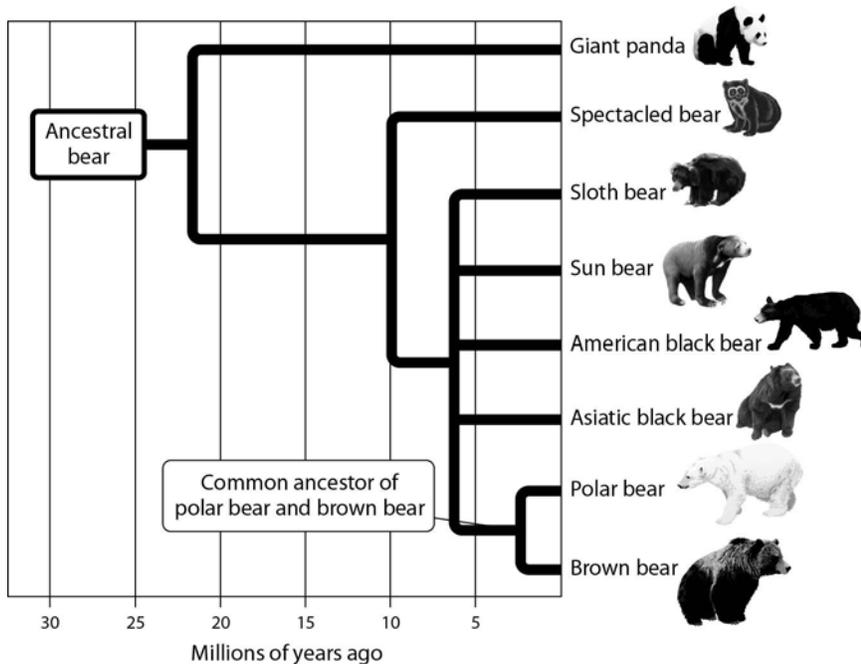
Answer: A

Topic: 1.3 The Process of Science

Skill: Knowledge/Comprehension

### Art Questions

1) Using the branching tree of life for bears depicted in the accompanying figure, choose from among the following bear species the one that is most distantly related to the sun bear.



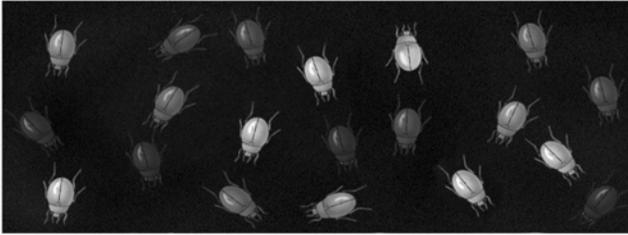
- A) brown bear
- B) sloth bear
- C) spectacled bear
- D) giant panda

Answer: D

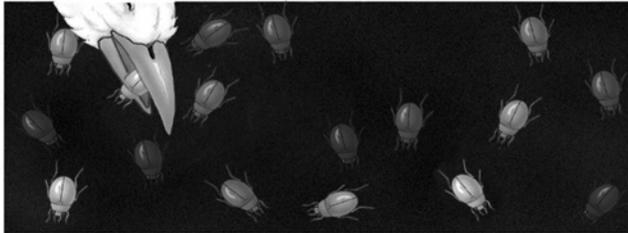
Topic: 1.2 Evolution: Biology's Unifying Theme

Skill: Application/Analysis

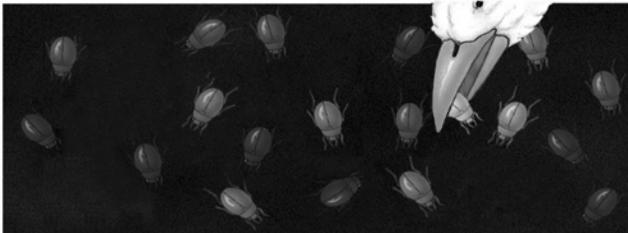
2) In the process of evolution by natural selection illustrated in the accompanying figure, which of the following is the mechanism or agent of natural selection?



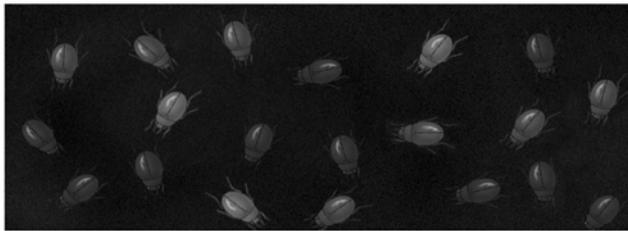
Population with varied inherited traits.



Elimination of individuals with certain traits.



Reproduction of survivors.



Increasing frequency of traits that enhance survival and reproductive success.

- A) artificial selection
- B) selective breeding
- C) selective predation
- D) selective beetles

Answer: C

Topic: 1.2 Evolution: Biology's Unifying Theme

Skill: Application/Analysis

## Scenario Questions

*Please use the following information to answer the following question(s).*

The collared lizard is a species found in the Desert Southwest. Male collared lizards show considerable color variation, ranging from brightly colored to a very dull pattern. Your goal is to determine the function, if any, of male color patterns in collared lizards, using the scientific method. Your tentative explanation is that male color plays a role in attracting females for mating purposes. You predict that females will preferentially choose brightly colored males over dull-colored ones. To test this prediction, you observed the interactions of female collared lizards with their male counterparts. You selected males that were the same age and size, and that differed only in their coloration pattern. You placed equal numbers of the two types of male lizards, bright and dull, in aquariums, along with one female lizard per aquarium. Out of 350 aquariums observed, the female chose to mate with the brightly colored male 277 times, and the dull-colored male 70 times. In 3 instances, the females did not mate with either type.

Create a bar graph of your data, plotting the type of male (dull or brightly colored) on the  $x$ -axis. On the  $y$ -axis, plot the frequency with which each type of male was chosen by females. Using this graph, answer the following question(s).

1) Is it reasonable to conclude (i.e., is it supported by the data) that female collared lizards prefer more brightly colored male lizards over dull-colored males?

- A) Yes, this conclusion is supported by the data.
- B) No, this conclusion is not supported by the data.
- C) The data do not clearly indicate a preference one way or the other.
- D) None of the above choices are correct.

Answer: A

Topic: 1.3 The Process of Science

Skill: Application/Analysis

2) Identify the experimental group of this case study.

- A) brightly colored female lizards
- B) brightly colored male lizards
- C) dull-colored female lizards
- D) dull-colored male lizards

Answer: B

Topic: 1.3 The Process of Science

Skill: Application/Analysis

3) Dull-colored males were part of the \_\_\_\_\_.

- A) observation group
- B) control group
- C) experimental group
- D) predicted group

Answer: B

Topic: 1.3 The Process of Science

Skill: Application/Analysis

4) Which of the following is the hypothesis of this case study?

- A) Male collared lizards exhibit color variation.
- B) Dull males are less likely to be eaten by predators.
- C) A function of male coloration is to attract females.
- D) Males prefer brightly colored females.

Answer: C

Topic: 1.3 The Process of Science

Skill: Application/Analysis

5) "Male collared lizards show considerable color variation." This is a(n) \_\_\_\_\_.

- A) hypothesis
- B) conclusion
- C) observation
- D) result

Answer: C

Topic: 1.3 The Process of Science

Skill: Application/Analysis